

Reengineering the Acquisition/Procurement Process: A Methodology for Requirements Collection

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Abstract—History has taught us that major process improvement can come about through a single paradigm change, or by a combination of smaller but important changes. The Acquisition Reengineering Project was initiated to help identify areas for improvement in the acquisition and procurement process at the Jet Propulsion Laboratory (JPL). The project team performed a feasibility study to generate requirements and perform preliminary benchmarking. As identified in the Acquisition Reengineering Project charter, the acquisition and procurement process begins when considering making or buying something (or preparing a proposal that would do so), and ends when all acquisition closeout activities are completed.

Capturing the voice of the customer is a key attribute of the project approach described in this paper. This paper shares how the Acquisition Reengineering Project team took a meticulous approach in identifying, interviewing, and following up with three key groups that support the acquisition process. The three groups include the key customers, stakeholders, and process performers involved with the acquisition process. The team held 44 working sessions with different categories of participants, with the goal to solicit and capture requirements. Approximately 400 people participated in these sessions.

The paper explains how participant groups were identified and provides tools for conducting the sessions.^{1,2} A balloting system, outlined in the paper, was devised to identify the improvement opportunities of greatest importance to the customers. The groups enabled the project team to identify many areas for improvement that resulted in final recommendations for project implementation (including “quick hits,” which could be implemented in the near term while longer-term reengineering proceeds). The requirements collection activity was supplemented by preliminary benchmarking, using a literature search approach, also summarized here. Sample areas for improvement in the acquisition and procurement process included shortening cycle times and introducing additional process efficiencies that would result in better customer

service for project managers and mission personnel while strongly supporting overall project schedules and goals.

This paper captures the systematic approach taken by JPL’s Acquisition Reengineering Project team, the methodology used, challenges faced, and lessons learned. It provides pragmatic “how-to” techniques and tools for collecting requirements and for identifying areas of improvement in an acquisition/procurement process or other core process of interest.

TABLE OF CONTENTS

1. INTRODUCTION	1
2. PROJECT PLAN.....	2
3. REQUIREMENTS COLLECTION: PROCESS AND TOOLS ...	4
4. BENCHMARKING	5
5. PROCESS REQUIREMENTS	6
6. QUICK HITS (QH).....	8
7. PURCHASE REQUISITION PILOT	9
8. NEXT STEPS	9
8. RECOMMENDATIONS AND FUTURE APPLICATIONS.....	10
9. SUMMARY	10
REFERENCES.....	11
BIOGRAPHIES.....	11

1. INTRODUCTION

The Jet Propulsion Laboratory (JPL) develops, delivers, and operates robotic space missions (e.g., Mars Exploration Rovers) and instruments (e.g., the Wide Field Planetary Camera on the Hubble Space Telescope), develops technology, and conducts scientific research. For space flight missions, spacecraft design and development may be done in-house (with many components acquired from other sources), contracted out to a system contractor (with JPL surveillance), or conducted with partners (a hybrid arrangement in which JPL and another entity coproduce the spacecraft). Nearly half of JPL’s annual budget goes out as procurements; when ancillary activities such as make-or-buy program, non-procurement acquisitions, and procurement requirements generation are factored in, the vast majority of JPL’s flight project work involves the acquisition process.

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² IEEEAC paper #1247, Version 2, Updated January 4, 2011

Acquisition is defined by NASA [1]. For purposes of the JPL Acquisition Reengineering Project, the NASA definition was slightly modified to provide the following working definition:

“JPL defines acquisition as the process for obtaining the systems, research, services, construction, and supplies that the Laboratory needs to fulfill its mission. Acquisition—which may include procurement (contracting for goods and services)—begins with an idea or proposal that aligns with the NASA Prime Contract (and subordinate Task Orders) and fulfills an identified need and ends with the completion of the program or project or the final disposition of the product or service.

“The goal of JPL’s acquisition process is to effectively and efficiently support programs and projects in meeting their programmatic, institutional, technical, cost, and schedule commitments. JPL’s broad concept of acquisition means that everyone at JPL and everyone supporting JPL has a role in acquisition” [2].

Because of the importance of the acquisition/procurement process to fulfilling JPL’s mission, the JPL Acquisition Division Manager, Mr. Karl Bird, commissioned the Acquisition Reengineering Project to “revolutionize the process at JPL”—a “major leap forward” [3]. It was fundamental to the assignment that this be designated a reengineering effort and not a process improvement one, as the former aims for 30% or more improvement and entails a new way of thinking about the process, whereas the latter looks for 10% improvement through incremental improvement ideas [4].

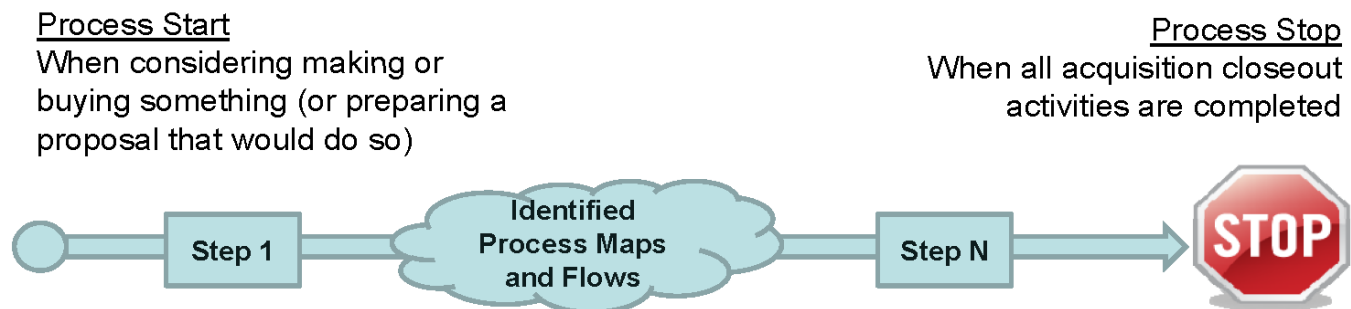
The charter for the Reengineering Project delineated a broad process scope, in line with the above process definition and goal. The project scope is depicted in Figure 1.

The Reengineering Project was conducted like a NASA flight project, as described in Section 2. This paper summarizes the project plan and specifically describes the methodology, results, and lessons learned from Pre-Phase A and Phase A.

2. PROJECT PLAN

A key up-front decision was to manage the reengineering activity as a project; thus it was named the Acquisition Reengineering Project. In particular, it was to be managed much like a NASA spaceflight project, incorporating the essential principles of the NASA rulebook, NPR 7120.5D [5]. A Project Manager (PM) was appointed, Mr. Randall Taylor, who had experience in JPL flight projects, acquisition/procurement, and reengineering. He was assisted by a process engineer, Mr. Tom Vanek, who had a background in information technology and client process improvement. They would constitute the project team in the earliest stages, with oversight and counsel by selected members of the JPL Acquisition Division management team.

Per 7120.5D, the overall project consisted of Phases A–E. (A brief Pre-Phase A proposed the scope and methodology of the project, culminating in approval of the project charter.) Each phase was planned with specific deliverables, which were independently reviewed, with successful phase



Preliminary

In Scope	Out of Scope
<ul style="list-style-type: none"> ► Procurements ► Non-procurement acquisitions (agreements) ► Property transfers ► All procurement vehicles issued by 26 (e.g., SWOs, RSAs, loan agreements, CSAs, P-cards, iProcurement, POs, subcontracts, whatever else we have) 	<ul style="list-style-type: none"> ► NASA assignment of a project/task/element to a Center ► Directed procurements

Figure 1—Acquisition Reengineering Project Scope

completion determined by the Decision Authority (DA), Mr. Bird, at a defined decision gate.

For example, Phase A was the feasibility task: if the project produced nothing of value, or something of value but not affordable, the DA would have had the opportunity to redirect the project (delta-Phase A) or discontinue it without entering Phase B. The project was proposed and announced as “exploratory,” with only a modest initial investment and a continuing requirement to make good.

As detailed below, we employed tools and techniques typical of flight projects, including Lean Six Sigma and reengineering methodology. (The team invented some implementation tools, identified infra.) There was continued focus on the process customers—how to do a better job for them, and, where possible, how to make life easier for the personnel who perform the process for the customers.

The project phases are shown in Figure 2.

While the overall project plan was outlined, particular attention was devoted, first, to fleshing out the Phase A/B plan (design), then, second, to fully expanding the Phase A approach (conceptual design). Phase A/B areas of emphasis were identified, several at inception, others as the team learned from the customers, from benchmarking, and from on-the-job experience. The final Phase A/B areas of emphasis are listed in Figure 3.

Due to fiscal year budget constraints and staffing availability issues involving the PM’s early time commitment, in practice Phase A was subdivided into three “activities.” The sum of the activities would produce all of the required phase deliverables, but the approach would allow for a slower pace with interim products. Although the slower pace was somewhat disappointing, it had unexpected benefits of increasing the interaction with the DA and of improving alignment with other Acquisition Division undertakings (discussed infra).

Phase A was subdivided as follows:

Activity 1, Requirements Generation—The objective of this activity was to capture customer requirements as the basis for proposing a concept (and subsequent design) that meets the requirements in a verifiable manner. Requirements were to be

solicited from customers, stakeholders, and process performers. Deliverables were to include preliminary process requirements and recommended “quick hits” for near-term implementation.

Activity 2, Feasibility Assessment—The objective of this Activity was to determine if the acquisition process, or a key subprocess, were suitable for reengineering. We were to analyze the current state of the process and conceive the desired future state. Products were to include a working requirements set, feasibility assessment, and detailed benchmarking plan.



Figure 2—Methodology: Project Plan

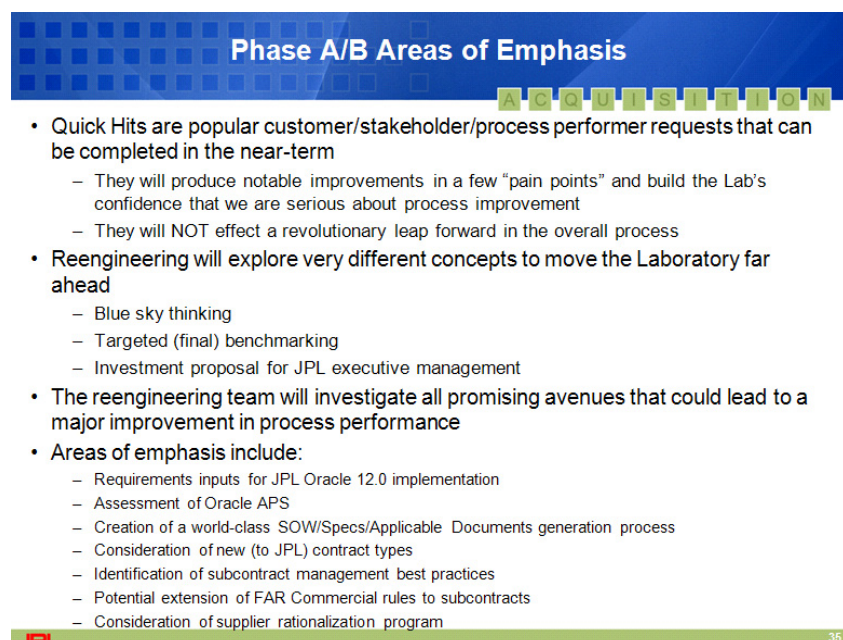


Figure 3—Phase A/B Areas of Emphasis

Activity 3, Concept Development and Advanced Benchmarking—The objective of this Activity was to produce the concept for a reengineered process (or subprocess). We were to conduct targeted benchmarking, conceptual design, and detailed project design planning. Products were the Phase A deliverables described earlier.

This paper describes the work done in Phase A, activities 1 and 2. The methodology, tools and techniques, results, and lessons learned form the subject of this paper. Future plans (remainder of Phase A/B) are also summarized.

3. REQUIREMENTS COLLECTION: PROCESS AND TOOLS

Customer, stakeholder, and process performer input was foundational for drafting and ultimately finalizing a concept, design, and requirements for the Acquisition Reengineering Project. We gathered this input in sessions approved by organizational managers. A balloting system, outlined in this paper, was devised to measure the importance to customers of candidate improvement opportunities. The customer, stakeholder, and process performer groups enabled the project team to recommend for project implementation a prioritized list of improvement areas.

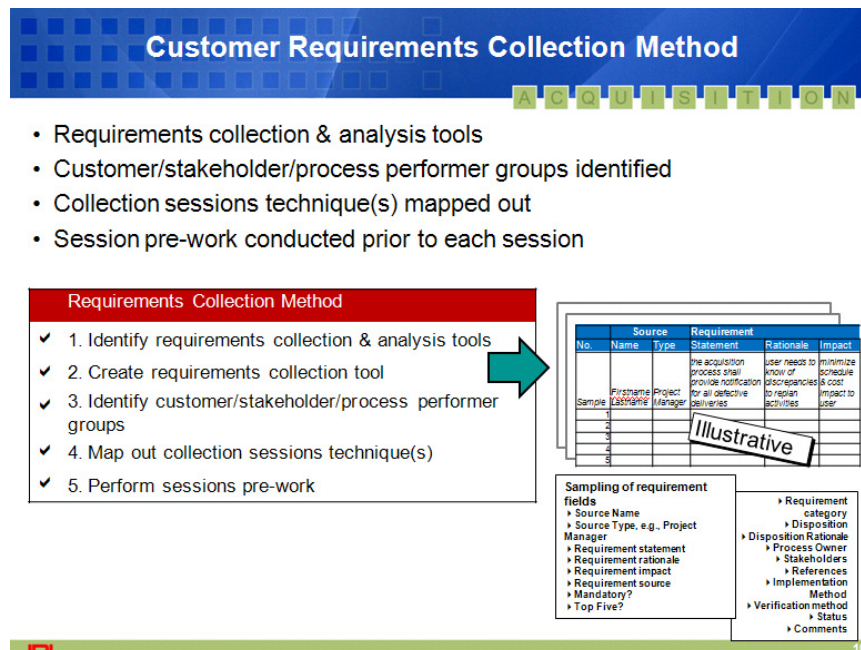
Before scheduling and conducting the sessions, we needed to identify each of the groups. Customers were informally defined as those needing to acquire an item at JPL. These were JPL employees in programs, projects, and technical divisions, for example. The project team held 23 customer sessions that included over 200 JPL customers.

Stakeholders were defined as those who, through their direct or indirect responsibility to the Laboratory, have a distinct purpose to serve and support procurements at JPL. Those who have a “stake” in any acquisition, or are included in any of the touch points when an item is procured, could be considered stakeholders. Stakeholders included employees in the Business Ethics Office, the Office of the General Counsel, and other areas in the JPL Business Operations Directorate. The Reengineering Project Team held 10 stakeholder sessions that included over 75 JPL stakeholders.

The final and very important group contributing to the requirements collection process was the process performers at JPL. Process performers are teams of individuals who directly support the end-to-end process of any acquisition made at JPL. They are the personnel who help to get the product or service into the hands of the customer after the request to acquire something is made. Examples of process performers include JPL Contract Technical Managers (CTMs), Subcontract Managers (SCMs), Project Acquisition Managers (PAMs), Cost Analysts, and those who work in Invoice Management or other acquisition-related organizations. The project team held 11 process performer sessions that included over 100 JPL process performers.

The approach and tools employed for requirements collection are outlined in Figure 4.

At each session, the project manager was the lead facilitator, asking participants to brainstorm about improvements to the acquisition process and stimulating discussion among session attendees. Meanwhile, one or two recorders captured participants’ ideas in real time on flip charts with easels.



After each session, the notes captured on the flip charts were put into an Excel spreadsheet used as the Requirements Collection Tool, also depicted in Figure 4. An email was sent to each attendee asking for feedback and clarity on the improvement ideas captured, as well as a vote for the top five ideas, in order of importance, that he or she would like to see implemented at JPL.

The team captured over 800 customer comments, including, for example, the following:

- The goal is to “get parts in my hands as quick as you can.” The speed of the process is important.

Figure 4—Customer Requirements Collection Method

- “The #1 priority is effective and regular communications.”
- “Every time we lose a day or a week it costs money.”

Following the customer sessions, the project team performed a preliminary data analysis, and identified the most commonly voiced/most impactful ideas, to prepare an electronic ballot for customer voting. Customers who attended a session were given access to a SharePoint survey and were asked to (1) rate each idea (item) on a list of 40 based on importance (Not Important at all, Fairly Important, Very Important) and (2) identify the Top 5 items from the list by typing the number of his/her selections in an input box. An extract of the customer ballot is provided as Figure 5. 51% of customers who attended the customer sessions cast votes—a very high response rate. Based on analysis, the project team found that customer voting is one data point—but a very important one. The customer voting process proved to be an excellent communication/feedback mechanism, as customers felt they were heard. It also proved to be a useful educational vehicle for the Acquisition Division process performers who attended the sessions.

Stakeholder and process performer sessions were conducted

in a manner similar to the customer sessions. However, the only feedback was to follow up with session attendees to request any corrections to the information that was captured and documented. No ballot was created or sent to the stakeholder and process performer groups. The project team captured 249 stakeholder comments and 479 process performer comments.

4. BENCHMARKING

Effective reengineering requires going beyond your own organization’s improvement ideas. It involves seeking out the best ideas of others: ideas from your own industry, but also from other industries, nonprofits, and federal agencies; ideas you can use as is, but also concepts that need adaptation in order to accomplish your intended purpose.

Due to budgetary and time availability constraints, during activities 1 and 2, only preliminary (coarse) benchmarking was performed. Detailed benchmarking was baselined for Activity 3.

Preliminary (coarse) benchmarking was implemented to identify key acquisition/procurement process improvement

Acquisition Reengineering Customer Ballot: Respond to this Survey

Thank you for participating in the Acquisition Reengineering customer ballot.

Please make your choices from the list below based on items that are important to you. Once you are done, be sure to click "Finish" to save your response.

	Not important at all		Fairly important		Very important	
	1	2	3	4	5	N/A
-- 1. Reduce the time it takes to place a procurement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-- 2. Subcontracts Managers (SCMs) need to provide consistent guidance to Project teams, Contract Technical Managers (CTMs) and support personnel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-- 3. The Noncompetitive Source Justification (Non-Comp) process needs to be improved.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-- 4. Acquisition personnel need to understand the impact to our project/task/year-end schedule when we have a delay in an item purchased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 5—Sample of Customer Ballot Items

areas that might not surface during the requirements collection sessions, but had been uncovered in support of previous Acquisition Division initiatives. Excluded from the coarse benchmarking study was targeted benchmarking of other organizations (advanced or fine benchmarking), because we needed to first generate the preliminary requirements on the process itself, against which we would benchmark others. (Also, resources were limited at this stage.)

Three tasks were included in the preliminary benchmarking effort.

- (1) Literature search by JPL. Many NASA, JPL, and National Contract Management Association (NCMA) documents were reviewed in search of promising, relevant suggestions. Thirty-five ideas were culled from ten of those sources (Tables 1 and 2). These joined customer/stakeholder/process performer requirements and other benchmarking ideas (see below) as potential process requirements or process solutions.
- (2) Literature search by Booz Allen Hamilton (BAH). From its worldwide set of clients, colleagues, and reachback support, BAH has access to a plethora of acquisition/procurement benchmarking data and implementation approaches. Ninety ideas were drawn from a dozen of the articles and presentations that BAH made available to the project. They were captured in the same manner as described in the previous paragraph.
- (3) Review of JPL Acquisition Initiatives. The JPL Acquisition Division, in some cases working with BAH, had been working on improvement initiatives prior to and/or in parallel with the Reengineering Project design work. The findings of these endeavors, whether complete or in-process, were folded into project thinking. The specific areas of interaction were
 - *Division Strategic Plan and Division Idea Summits*—The draft preliminary process requirements were mapped against the former document and the latter sessions’ outputs in order to determine if the requirements were consistent with the objectives and findings of these initiatives (they were) and whether there were any good ideas not uncovered through the requirements collection sessions or literature searches.
 - *Requisition to Closeout (R2C) Project*—R2C was a planned future project at JPL that would determine which, if any, Oracle Advanced Purchasing System (APS) modules would be added to the existing JPL Oracle enterprise business system. APS potentially could meet some or many of our acquisition/procurement process requirements; first we needed to generate the working requirements that

APS might or might not fulfill. The Activity 1 and 2 result, as anticipated, was to recommend further study of APS/R2C during the remainder of Phase A/B.

- *Key Performance Indicators (KPIs)*—The JPL Acquisition Division initiated a task to identify KPIs to support decision-making, reporting, and assessment of organizational health. This would culminate in an “Acquisition Process Dashboard.” A mini-workshop had identified 32 potential KPIs. These were reviewed by the project team and found to be consistent with the process preliminary requirements.

5. PROCESS REQUIREMENTS

The draft preliminary process requirements resulted in 54 “would be” requirements. These requirements would have the potential to be implemented based on further funding and support by JPL. (Many of the requirements are partially or fully met by the existing process, but it was considered essential to document even instantiated requirements where they were important to customer service or compliance. In the requirements collection sessions, we specifically asked the participants to identify things that are being done well, which they would not want us to inadvertently eliminate.) Where possible, the requirements were expressed as functionality only, not specifying any design solution. Each requirement was further vetted to align with the Acquisition Division Strategic Plan and Idea Summit information-gathering during each project lifespan.

Table 1. JPL Acquisition Reengineering Project Benchmarking Analysis

No.	Ref.*	Best Practice
1	1	Need "total familiarity with all of the various procurement tools available to purchase goods and services coupled with the ability to differentially use them to the customer's advantage."
2	1	Design, specification, and supplier development can have far more impact than negotiations on cost.
3	1	"Does the procurement office wait for a 'ready requisition' tossed over the transom from the customer, or are they proactively involved in the development of the requirement?"
4	1	Procurement Management Action Team (PMAT) model of 11 elements.
5	1	% of procurement actions using a formal supplier rating system.
6	1	"Base an enlightened oversight program on earned autonomy." (And take it away if abused.)
7	2	NASA/Industry Process Action Team to identify issues that hinder the acquisition process.
8	3	Use NASA-wide agency contracts instead of new awards.
9	4	NASA procurement training and career development certification program.
10	5	"I am requesting you survey the requiring activities at your center to determine perceived and real impediments to an efficient acquisition process, and to solicit constructive recommendations for improvement of the process."
11	5	"There is still a feeling of estrangement between procurement and other organizations. . . ."
12	5	"The acquisition process is not well understood outside of procurement. . . ."
13	5	"Other organizations generally believe that we are not sufficiently involved in the planning process and are properly sympathetic to their needs."
14	5	"The old adage is that we are risk adverse, that we can hide behind a strict interpretation of the [FAR] . . . while showing no innovation in helping the requiring organizations to procure their equipment, studies, or services on time."
15	6	Complex systems and services acquisitions have two processes: requirements development and generation, and contracting.
16	7	ARMS [Acquisition Resource Management System] is single resource for best practices, tools, templates, policies, etc.
17	7	ARMS includes policy, procedures, and guidance.
18	7	Communities of Practice with discussion forums, calendars, document libraries, search capabilities, worksites/spaces.
19	8	Complete EEE [electrical, electronic, and electromechanical] parts status visible to everybody at any time.
20	8	JPL preferred parts list.
21	8	Parts library, including footprint, review information, test data, etc.
22	8	Standard project requirements for different mission classes.
23	8	Maintain common stock of EEE parts.
24	8	Blanket contracts for common buys.
25	8	Improve noncompeted process for common parts.
26	8	"Who tracks PO prior to receipt at JPL dock?"
27	8	Time from PO let to PO delivered?
28	8	Process to acquire single "emergency" parts.
29	8	"Each project has its own process."
30	8	"Every group at JPL does it differently."
31	8	Meetings to get data.
32	8	Multiple procurements for the same part.
33	8	"We spend too much money if a one-cent part is short."
34	9	"When you automate, you take all the flexibility out of it."
35	10	Any reporting costs direct and indirect to generate, and also for reviewing, analyzing, etc., so eliminate what you can.

*See Table 2 for References keyed to numbers in this column.

Listed below are a few of the draft preliminary process requirements:

Sample of Acquisition Reengineering Preliminary Requirements

Requirement: Programs, projects, tasks, and proposals shall contact Acquisition at the beginning of their life cycle to formulate acquisition strategy and negotiate support commitments.

Requirement: The process shall track purchase requisition entry through purchase order award and purchase order award through purchase order closure, while publishing the cycle time metrics for customers.

Requirement: Purchase requisition required steps and responsible parties shall be published for end users (requestors) and preparers.

Requirement: The process shall establish a method for identifying significant repetitive-buy commodities and options for quickly acquiring them.

Requirement: SCMs shall proactively communicate status and problems/issues to the end user and appropriate supporting personnel.

Requirement: A process and standard shall be established for receiving timely and accurate invoices from subcontractors.

Table 2. JPL Acquisition Reengineering Project Benchmarking References

No.	Reference
1	"The Procurement Manager of the Future," Contract Management, by Robert Welch, December 1997.
2	"Procurement at a Glance: Accomplishments," NASA Office of Procurement Website, November 1996.
3	"Procurement at a Glance: Consolidated Contracting Initiative (CCI)," NASA Office of Procurement Website, undated.
4	"Training/Career Development Requirements for Promotions," by Barbara Cephus, NASA HQ Acquisition Division, undated.
5	Letter from Darleen Druyan, NASA Assistant Administrator for Procurement, to Dr. Edward Stone, JPL Director, October 4, 1991.
6	"Improve Your Acquisition Process with Lean Six Sigma, Part 4," Contract Management, by John Dobriansky, November 2009.
7	"ARMS: The Acquisition Resource Management System: A Knowledge Management Solution," Contract Management, by Mark Weinstein et al., December 2009.
8	"Electronic Parts Process, Part I—Design to Flight Stores," JPL LSS Outbrief Package, Feb. 16–17, 2010.
9	Eugene Tattini, while presenting LSS certificates to Green Belts.
10	NASA AAA Gerstenmeier, at NASA PM Challenge Conference, 2010.

Requirement: A process and standard shall be established for timely review and payment of invoices, and unencumbering of funds from subcontractors.

Requirement: The process shall measure suppliers' and subcontractors' cost, schedule, and quality performance.

Requirement: The process shall be compliant with the JPL Prime Contract, and with Flight Project Practices and Design Principles (for project acquisitions). The process shall recommend selective revisions to these governing documents where substantial process improvement is expected.

The Preliminary Requirements set was then analyzed to identify potential "quick hit" candidates and to refine the plan for the remainder of Phase A/B.

6. QUICK HITS (QH)

The PM learned the hard way on a previous reengineering project that having a strong design and a thorough implementation plan is meaningless to the intended beneficiaries if they cannot see, early and often, significant process improvement deliveries. The early deliveries, "quick hits," need not—and generally cannot—be major, but they must provide positive functionality. This builds customer trust in the project team, as well as making life a bit better in the short run while the medium- and long-term reengineering developments are completed.

The first step for the reengineering team is to define the criteria for a "quick hit." The following criteria were devised for JPL acquisition reengineering, some of which should be generally applicable and others of which were specific to the environment we were working in.

- They have clear value to the customers (primarily), stakeholders, and process performers (if they don't benefit someone now, they shouldn't be rolled out at this stage, if indeed ever).
- They are properly sized to be implemented within six months or less (Lean Six Sigma Kaizen-sized or

smaller; if they take more than a maximum of a half year—preferably shorter—they aren't ready for early implementation).

- They do not require any programming by the institutional IT organization (because it was dedicated to an Oracle 12.0 upgrade project and consequently was not currently available to support quick hits).
- The necessary resources are available and fit within the Division budget or possible small augmentation (don't promise an early win that you don't have the resources to deliver).

An improvement opportunity that needs more study, even if it otherwise met the above criteria, would be left for further development during the remainder of Phase A/B, during which time it could be spun off as an additional quick hit.

Quick hits can be implemented in several ways, for example, "Just Do It" (a command decision by the process owner), facilitated focus group, division process improvement minitask, or Lean Six Sigma Kaizen event. They can be implemented by the reengineering project or by other personnel, but in the latter case with project interaction as discussed below.

Twelve Quick hits were identified to the DA for consideration, in addition to the recommendation that two in-process actions be approved for prompt completion. Each was identified by title, description (brief), associated process requirement(s), implementation method, and comments.

Quick hits need to be carefully managed. Effectively managed, they provide visible benefits, reinforce advocacy, and smooth the path for the more radical procedural and cultural changes to come later. Poorly handled, they encourage pessimism, dilute support, and become a self-inflicted problem to solve at the very time new process design needs to move into full gear.

The Reengineering Project established a quick-hits management approach, covering womb to tomb on each approved QH. For tasks not to be performed by the project

itself (in our case, all 12 of the new items; the two in-process ones the project would continue to completion), the PM would identify applicable process requirements and background information from requirements collection sessions, recommend team members within and outside of the Acquisition Division, and concur on the QH charter to ensure consistency and synergy with the project Phase A/B effort. Next, the QH team would provide an interim (“halftime”) briefing to the PM and the management team’s process improvement coordinator to ensure continued alignment with the preliminary requirements and the Strategic Plan, and to allow the PM and staff to help the team with any issues, concerns, resource needs, etc. Then, the PM would chair a peer review of the task (not necessary for Just Do It actions), including selected participants from the customer/stakeholder/process performer sessions; the review would assess the completed product against the pre-published success criteria and identify any liens against acceptance. Finally, the DA would approve or disapprove the team delivery and, as appropriate, it would be implemented, modified, or dropped.

7. PURCHASE REQUISITION PILOT

Per direction of the DA, the project put the reengineering design effort on hold for a period of time to conduct a pilot project to reengineer the purchase requisition (PR) subprocess at JPL (an unpopular set of transactions regularly being complained about to the Division Manager and even the Director of JPL).

This was successfully completed. A cross-functional team participated in a facilitated Lean Six Sigma Kaizen event and designed the new subprocess and prepared the basics of an implementation plan. The new process design was thought to be a final design at that point, but during implementation it proved to be only preliminary. The implementation effort resulted in the project delivering 11 “enablers” that collectively improved matters for customers (end users/requestors) and process performers (control points, approving authorities, and procurement personnel). The enablers were (1) updated procedure, replacing previous procedure and previous guidelines document; (2) requisition preparation template for end users, (3) rejection criteria for requisitions, identifying the most common causes of unacceptable requirements; (4) Oracle system online help definitions for requisition preparers; (5) masking (graying out) of Oracle screen fields not necessary for the PR; (6) improved and regulatory-compliant hazardous use codes; (7) automated signature authority check within Oracle, eliminating a separate check performed late in the process by Subcontract Managers using a different database; (8) 72-hour signature approval time limit within Oracle, with twice-a-day alerts to the approver that a request is pending; (9) improved status alerts for end users; (10) “Find Your Req” functionality, in an iProcurement application, allowing end users and

preparers for the first time to find the status of their PR online; and (11) updated requirement preparer training course, highlighting the new process improvements.

Customer and process performer feedback has been very positive. Comments included “The new PR status tracking capability is great! It addresses a long-standing concern in the user community” and, more succinctly, “Very cool!!!”

This important task essentially preempted some of the planned project Phase A/B work: to identify a process or subprocess suitable for reengineering, design the process solution, and implement the design solution.

The project also participated in completion of the other in-process undertaking, the promulgation of standard documentation deliverables requirements for space flight subcontracts (standard Subcontract Data Requirements List/Data Requirements Descriptions [SDRL/DRDs]). These were successfully piloted on several project procurements, approved for general use, and are now in operational status.

8. NEXT STEPS

As summarized above, the Reengineering Project completed the overall project Pre-Phase A and Activity 1, and most of Activity 2 of Phase A at the time of this writing. The project delivered process preliminary requirements, coarse benchmarking results, and a menu of quick hits for DA selection. The project received the results of precursor work by others, including detailed process current state mapping and many potential process solution ideas.

The DA has selected two of the quick hits for implementation. The first will establish communications norms, and standard principles and practices for communication with customers. The PM will lead a cross-functional team, including customers and process performers, to identify customers’ communication needs (who, what, when, where, how) and implement the agreed-upon solution. The second will reengineer a subprocess of the purchase requisition process that was deferred from the PR Pilot. The PM will co-lead a multi-disciplinary Kaizen to establish a process for establishing, operating, and decommissioning control points (offices that are required to approve or disapprove specific types of buys, e.g., safety equipment).

Besides the project’s participation in these quick hits, the next immediate step is to complete Activity 2. The primary work effort will be in terms of conceiving the project future state, including the possible role of APS, and generating the coarse (targeted) benchmarking plan. These products will be included in a project feasibility report, with the expectation that the project will recommend the expansion of the reengineering Core Team and initiation of Activity 3.

However, budgetary constraints at JPL may necessitate a longer-than-desired design cycle.

Assuming success with Activity 2 and budgetary approval, Activity 3 would employ the expanded team to complete the design concept for the reengineered acquisition/procurement process (or a major subprocess). This would include the results of the advanced benchmarking and would be included in a draft detailed Project Plan, all to be assessed as part of an independent Concept Review prior to Key Decision Point (KDP) B. (Review board members would include representatives of the customer, stakeholder, and process performer communities, as well as division management.) The reengineered process conceivably could pivot off a single breakthrough paradigm change; more likely, it would entail the combination of several smaller but significant improvement innovations.

9. RECOMMENDATIONS AND FUTURE APPLICATIONS

The Acquisition Reengineering Project at JPL is off to a good start. Lessons learned include the following:

- (1) Manage the process improvement effort like a flight project. If it is treated as a research effort, there is great risk that the schedule will drag out. Committing to deliverables at each phase is a powerful incentive to stay on track.
- (2) Utilize a disciplined requirements collection methodology, including separate customer, stakeholder, and process performer sessions. Limiting the sessions to one hour boosts attendance, and employing a post-session feedback mechanism keeps interest high. Sessions should be scheduled and led by a personally known manager and supported by two recorders for best efficiency. Give appropriate lead time to schedule the sessions and accommodate other individual schedules. This takes the most time.
- (3) Clearly communicate ground rules of engagement. Anonymity may be very important to participants; protecting it will encourage them to express areas of frustration or concern. At the same time, draw out things that are working well with the current process. Use brainstorming techniques so that every attendee has an opportunity to be heard. Learn as you go, and tailor the future sessions to what has been learned from current sessions.
- (4) Keep the project sponsor informed on a regular basis, usually with bi-weekly or monthly status checks. Otherwise, he or she will be wondering what exactly you are doing!
- (5) Ensure that the communication loop with the customer is closed, accepting revisions and feedback from prior sessions as well as following up with final results and a way-forward or action plan.
- (6) Where there are preexisting or concurrent process improvement initiatives, build an early and continuing relationship with those involved. They may perceive your effort as a threat, when you should be able to help one another. This was an area we should have put more emphasis on.
- (7) Try to go in with an unbiased approach and opinion, to not sway the direction of how a discussion may be going. However, also keep in mind that active facilitation is important in order to keep the session on track, and to indicate starting and ending points for a particular discussion (i.e., course correction or keep within scope if necessary).
- (8) Avoid insular thinking by performing benchmarking, especially with industry, if performing this for a government organization. Even if requirements are immature and resources are in short supply, useful benchmarking can be done in a literature search mode.
- (9) Identify “quick hits.” These provide key opportunities to get new capability out to the customers and process performers and to build advocacy for continuation of the project. And if the project needs to be discontinued downstream due to budget cuts, it will have already made a positive impact on the organization.

The methodology described in this paper can be effectively applied to the acquisition/procurement process at any organization (industry, government, academia, nonprofit). More importantly, it may be applied to any enterprise process of interest—engineering, scientific, or administrative. For best results, tailor the approach and the tools to fit your organization’s business model and culture.

10. SUMMARY

The Acquisition Reengineering Project at JPL successfully completed Pre-Phase A and Activities 1 and 2 of Phase A. It successfully implemented an efficient requirements collection methodology and produced process requirements and a plan for project completion. It also delivered one reengineered subprocess as a valuable interim capability [6].

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